



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|----------------------------------|-------------|----------------------|---------------------|------------------|
| 09/990,087 | 11/20/2001 | Stephen G. Sligar | 87-00 | 1280 |
| 23713 | 7590 | 05/11/2004 | EXAMINER | |
| GREENLEE WINNER AND SULLIVAN P C | | | LI, RUIXIANG | |
| 5370 MANHATTAN CIRCLE | | | ART UNIT | |
| SUITE 201 | | | PAPER NUMBER | |
| BOULDER, CO 80303 | | | 1646 | |

DATE MAILED: 05/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/990,087

Applicant(s)

SLIGAR ET AL.

Examiner

Ruixiang Li

Art Unit

1646

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 37-60 is/are pending in the application.
- 4a) Of the above claim(s) 44-58 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 37, 59 and 60 is/are rejected.
- 7) ☒ Claim(s) 38-43 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>3/27/2002</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Application

The Request filed on March 1, 2004 for Continued Examination (RCE) under 37 CFR 1.114 of Application 09/990,087 is granted. An action on the RCE follows.

Applicants' Amendment and Claims

Applicants' amendment filed on March 1, 2004 has been entered in full. Claims 1-36 have been canceled. Claims 37-60 have been added and are pending. Claims 37-43, 59, and 60 are under consideration, whereas claims 44-58 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention. It is also noted that an amendment filed on 2/14/2002 was also entered timely.

Applicants' request to rejoin nonelected species is noted. Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office Action.

Art Unit: 1646

Withdrawn Rejections and/or Objections

Applicants' cancellation of claims 1-36 has made all the rejections and objections as set forth in the final action (December 2, 2003) moot.

Claim Rejections Under 35 U. S. C. § 112, 2nd Paragraph

(i) The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

(ii) Claims 59 and 60 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 59 and 60 recite "a tandem repeat membrane scaffold protein". Neither the specification nor the art define the term unambiguously. It is unclear whether the term refers to "repeat" of an amino acid sequence, a specific structure (e.g., a helix), or both. Thus, It is unclear what the metes and bounds of the term are, rendering the claims indefinite.

Claim Rejections under 35 USC § 102 (b)

Claims 37 and 59 under 35 U.S.C. §102 (b) as being anticipated by Bayburt et al. (*Journal of Structural Biology* 123:37-44, 1998). The claims 37 and 59 are rejected on the same basis for the rejection of canceled claim 13 as set forth at page 5 in the previous office action (Paper No. 8, June 11, 2003).

Bayburt et al. teach reconstitution and imaging of an integral membrane protein, NADPH-cytochrome P450 reductase in a nanometer-size phospholipid bilayer. This nanobilayer consists of an approximately 10-nm-diameter circular (discoidal) phospholipid domain stabilized by apolipoprotein A1, an amphipathic membrane scaffold protein (See, e.g., Abstract), which forms α -helices (top of right column of page 37). The apolipoprotein A1 has eight 22-mer and two 11-mer tandem amino acid sequence repeats, each with the periodicity of an amphipathic α helix. Thus, the reference of Bayburt et al. meets the limitations of claims 37 and 59.

At page 10 of Applicants' amendment filed on March 1, 2004, Applicants continue to argue that the claims have been amended to recite an "artificial" membrane scaffold protein, whereas artificial membrane scaffold proteins are distinct from apolipoprotein AI of Bayburt et al. in their amino acid sequences. The specification describes artificial membrane scaffold protein sequences in which certain helices of native apoAI are repeated, deleted or replaced with other helices, or have truncations, or have altered hinge regions. Applicants noted that the recited membrane scaffold protein is a tandem repeat membrane scaffold protein.

Applicants' argument has been fully considered, but is not deemed to be persuasive because the term "artificial" does not limit the scope the claimed invention and does not distinguish the instantly claimed scaffold protein from those taught in the art because, as noted in the final action, a membrane scaffold protein, e.g., apo A-I protein, can be

Art Unit: 1646

made by DNA recombinant technology and such an artificial scaffold protein can have the same sequence as that of a membrane scaffold protein isolated from a natural source. In addition, as noted above, the apolipoprotein A1 has eight 22-mer and two 11-mer tandem amino acid sequence repeats, each with the periodicity of an amphipathic α helix. Thus, the reference of Bayburt et al. meets the limitations of claims.

At the top of page 11 of Applicants' amendment filed on March 1, 2004, Applicants argue that the reference of Bayburt et al. relates to cytochrome P450 reductase, a tethered membrane protein, not an integral membrane protein. Applicants submit that the apolipoprotein A1 is not a tandem repeat membrane protein.

Applicants' argument has been fully considered, but is not deemed to be persuasive because Bayburt et al. clearly teach NADPH-cytochrome P450 reductase is an integral membrane protein (2nd paragraph of left column of page 38). NADPH-cytochrome P450 reductase is also recognized as an integral membrane protein in additional references (e.g., Bayburt et al., *Langmuir*, 16: 5993-5997, June 17, 2000). Furthermore, as noted above, the apolipoprotein A1 has eight 22-mer and two 11-mer tandem amino acid sequence repeats, each with the periodicity of an amphipathic α helix. This is further evidenced by the general art (e.g., Segrest et al., *J. Biol. Chem.* 274:31755-31758, 1999). Applicants cannot simply argue against the teachings in the art, which includes the publications of inventors.

Art Unit: 1646

Claim Objections

Claims 42 and 60 are objected to because they recite unelected subject matter, amino acid sequences (SEQ ID NOS: 6, 9, 19, 23, 29, 43-45).

Claims 38-43 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Appropriate correction is required.

Conclusion

No claims are allowed.

Advisory Information

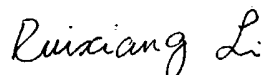
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ruixiang Li whose telephone number is (571) 272-0875. The examiner can normally be reached on Monday-Friday, 8:30 am-5:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yvonne Eyler, can be reached on (571) 272-0871. The fax number for this Group is (703) 872-9306.

Communications via Internet e-mail regarding this application, other than those under 35 U.S.C. 132 or which otherwise require a signature, may be used by the applicant and

Art Unit: 1646

should be addressed to [yvonne.eyler@uspto.gov]. All Internet e-mail communications will be made of record in the application file. PTO employees do not engage in Internet communications where there exists a possibility that sensitive information could be identified or exchanged unless the record includes a properly signed express waiver of the confidentiality requirements of 35 U.S.C. 122. This is more clearly set forth in the Interim Internet Usage Policy published in the Official Gazette of the Patent and Trademark on February 25, 1997 at 1195 OG 89.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (571) 272-1600.



Ruixiang Li, Ph.D.
Examiner
May 3, 2004